Salt-Dome Locations Purpose, Scope and Discrepancies between references

PURPOSE AND SCOPE

This study was initiated under the Gulf Coast Regional Aquifer-System Analysis to compile published data on salt domes to the edge of the Continental Shelf. The composite data were compiled to study the possibility of salt domes as a source of salt in brine waters in Cenozoic sediments of the Gulf of Mexico Coastal Plain in the south-central United States and adjacent Continental Shelf (Williamson and others, 1990, p. 107).

The shallowest permeable zone penetrated by each dome has been identified in order to assess the possibility of salt dissolution and movement through the permeable zones. In this report, the compiled data are displayed on a map and in a table. Salt-dome locations and geometry were compiled from eight sources, each of which investigated all or part of the study area. Salt-dome name, location, depth to salt and caprock, diameter, volume, and identifying sources used for this compilation are provided in a table.

DISCREPANCIES BETWEEN REFERENCES

Identification of salt dome locations from each of the references used to construct plate 1 are compared in table 1. The discrepancies in dome identification between references are due to several factors. First, the more recent references reflect advances made in seismic surveying and other remote sensing methods of geophysics. Therefore, some structures that were identified by earlier references as salt domes have been reclassified as non-salt structures, whereas other salt domes have been identified for the first time. For this reason, recent references were favored in compiling these data. Second, despite the advancements, identification of salt domes from seismic surveys remains highly subjective (such that two people using the same data may reach different conclusions). Third, the different investigations are based on different databases of raw material and published information. For example, the U.S. Department of the Interior (1983) lists neither Martin (1980) nor Halbouty (1979) as references.

Halbouty (1979) lists only those salt domes that have been confirmed by drilling, so that his base list of 343 domes should be considered fundamental. However, Halbouty (1979) also identifies some domes that no other sources identified (for example, Eugene Island Block 231). Finally, the references use different depth criteria for identifying salt domes from deeper salt structures.

Understanding the problem of locating and identifying salt domes from seismic survey data is important because seismic surveys are a major source of information for most of the

references used in this report. For example, most of the offshore domes from Martin (1980) were identified from single-channel seismic surveys and gravity surveys. Single-channel seismic analysis does not allow for the differentiation between salt domes and shale plugs (Martin, 1980) because both are piercement structures of similar densities. This may explain the large number of structures (481) that Martin (1980) identified. Additionally, the actual location of salt domes may be blurred because of an effect called sideswipe that allows structures some distance from the map trace of the seismic line to be projected onto the line. Exact salt dome locations can be determined only from a very tight pattern of seismic lines and by correlating seismic surveys with other data.